**Population Growth Equations Practice Worksheet**

Formulas:

**Rate Population Growth Exponential Growth Logistic Growth**

dY/dt dN/dt = B – D  

Key

dY = amount of change

B = birth rate (#of organisms born / 1 year)

D = death rate (# of organisms died / 1 year)

N = population size (# of organisms in the population)

K = carrying capacity (maximum number of organisms that the environment can sustain)

rmax = maximum per capita growth rate of population (decimal value, a value of 1 means that the population size is doubling or increasing by 100% each year)

 =  =  = number of organisms added per unit time (ex: per year)

Example 1:

There are 300 falcons living in a certain forest at the beginning of 2013. Suppose that in 2013, there are 50 falcons born and 30 falcons that die.

a. What is the population growth rate for the population in 2013 (include units)? What does this value mean?

b. What is the per capita growth rate of the falcons over a year? What does this value mean?

c. Fill in the table and the construct a graph.



|  |  |  |
| --- | --- | --- |
| Year | Calculation | Population Size (N) |
| 2013 |  |  |
| 2014 |  |  |
| 2015 |  |  |
| 2016 |  |  |
| 2017 |  |  |
| 2018 |  |  |

d. Find the average rate of change for the falcon population from 2013 to 2018 (include units). What does this value mean?

Example 2:

Kentwood, Michigan had a population of 49,000 in the year 2013. The infrastructure of the city allows for a carrying capacity of 60,000 people. rmax = .9 for Kentwood.

a. Fill in the following table. Then graph year vs. population size.

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Population size (N) | Growth Calculation | Population growth rate (dN/dt) |
| 2013 |  |  |  |
| 2014 |  |  |  |
| 2015 |  |  |  |
| 2016 |  |  |  |
| 2017 |  |  |  |



b. What happened to the population size over the years? What happened to the population growth rate over the years? Use the term carrying capacity in your response.